SCIENCE NEWS-LETTER

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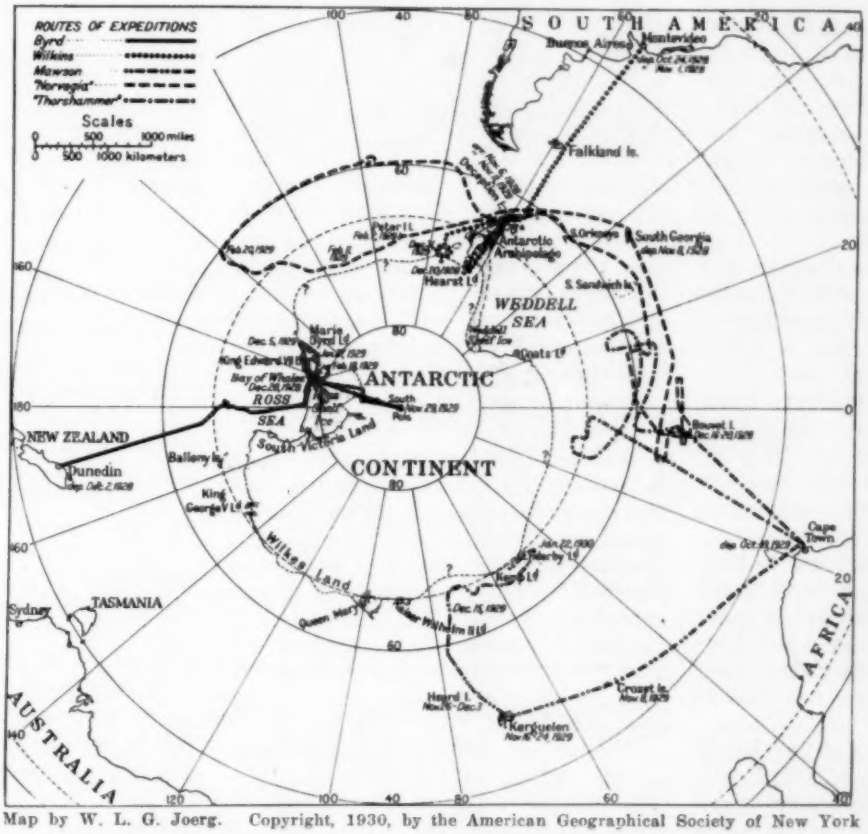

Map by W. L. G. Joerg. Copyright, 1930, by the American Geographical Society of New York

CONQUERING THE ANTARCTIC

Where Brave Men Explored the South Polar Regions, 1928-30

(See page 99)

Vol. XVII No. 462

Mobilize to Fight Insect Pests

Entomology

THE forces that wage defensive war against the European corn borer met at the U. S. Department of Agriculture under the chairmanship of Dr. W. H. Larrimer of the Bureau of Entomology. This was the fourth conference of its kind, and the attendance represented not only the federal workers against the pest, but also all the states of the corn belt,especially those where the borer is now active, together with delegations from farm organizations, scientists and farm machine manufacturers. An international note was injected by the participation of the Canadian Department of Agriculture and of the Province of Ontario.

The area of known infestation made its usual annual advance of from 20 to 30 miles during 1929, Dr. Larrimer stated. Its most westerly point is now in Boone township, Porter County, Indiana, about 30 miles west of Chicago. From there the borer frontier sweeps across Indiana and Ohio in a wide southeasterly curve, reaching its farthest south at the southern tip of Ohio.

This does not mean that all the territory behind this frontier is overrun with borers. The discovery of a single infestation will put a whole township on the borer map; a many of the farms in the very heart of the borer country are very little troubled. The main object in plotting the distribution to include every known borer locality within the line is to facilitate the work of the quarantine men who are endeavoring to keep the pest from making a long jump into the heart of territory still uninfested as a stowaway in a load of fodder or even in a batch of "roastin'-ears" carried by an automobile tourist.

Without minimizing the gravity of the corn borer situation, Dr. Larrimer declared that the situation is not alarming, and will not be alarming even when the borer shall have covered the whole of the corn belt.

"There is no hope of completely eradicating it, as there is in the case of the Mediterranean fruit fly in Florida," he said. "The insect had become too firmly established over too wide a territory before it was discovered. Moreover, it over-winters in corn stubble and in all sorts of left-over plants and weeds, instead of just in fruits; so that a complete clean-up is out of the question. And if we could get it out of the United States, there would still remain the heavy infestations over the Canadian border, ready to reinvade our fields every season.

"The answer to the corn borer problem is to learn how to live with the creature, since we cannot get rid of it. Fortunately, we have been able to make considerable progress along this line. We have learned much about the borer's life history and habits and are busy learning more. This will enable us to attack it at its weakest point. In several places, experiments with insects that parasitize and kill it are in hopeful progress. And we know that cleaning the last inch of stalk off an infested field, leaving the borer the very minimum of winter quarters, will greatly reduce the number of borers during the following year. All these methods, and many others besides, are on the agenda which will be discussed at the forthcoming conference."

Pink Bollworm Menace

CONGRESS has been asked for an emergency fund to fight the pink bollworm of cotton in Arizona, by a joint resolution introduced in the House by Rep. Lewis Douglas of Arizona. The situation is represented as serious, and the money is needed to compensate planters for losses they will incur through the eradication methods used in fighting this pest.

The pink bollworm is not related to the boll weevil. It is the larva of a moth, while the weevil is the child of a long-snouted beetle. The bollworm, like the weevil, is native to Mexico, but has not yet succeeded in invading the United States extensively. However, its presence along the border causes continual apprehension and makes a close watch constantly necessary.

Its presence in areas devoted to the long-staple Acala and Pima cottons in Arizona is represented as carrying an unusual menace, because these cottons are peculiarly adapted to certain industrial needs not met by the shorter-staple cotton grown elsewhere. Furthermore, the lands at present infested are not visited by hard frosts in winter, which increases the chance of the survival and spread of the insects if not promptly and completely wiped out.

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In This Issue

Cancer Program

A group of United States Senators will shortly sit across the table from medical men and research specialists and try to decide what program the government should undertake in seeking the cause and cure of cancer.

Senator William J. Harris, of Georgia, heads a new subcommittee of the Commerce Committee, which will look into the recommendations already made by many of the country's most eminent surgeons and laboratory workers.

It is expected that many of those who have already written to the committee will appear in person for questioning and consultation. The head of the U. S. Public Health Service, Surgeon General Hugh S. Cumming, will probably be present at many of the meetings and will assist in shaping whatever plans are adopted.

Medicine

Science News-Letter, February 8, 1930

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Acres of Penguins in Antarctica

Geography

Dr. Bowman Tells of Practical Value of Polar Exploration

PENGUINS by the acre are among the profusion of water animals inhabiting the regions adjacent to the desolate lands of Antarctica that help make its exploration of value, Dr. Isaiah Bowman, director of the American Geographical Society, told the American Philosophical Society. Dr. Bowman spoke in the 141-year-old hall of the society, built with money raised by Benjamin Franklin, its founder. A portion of the address was broadcast over a network of radio stations of the National Broadcasting Company, including a short-wave station at Pittsburgh. Through this station three expeditions now in Antarctica—those of Admiral Richard E. Byrd, Sir Hubert Wilkins and Sir Douglas Mawson—heard their labors described.

"Though the land life is poor, the shallow water life about the rim of the Antarctic is amazingly rich," said Dr. Bowman. "Owing to the upwelling of the deeper waters near the shore, as the strong winds brush the surface waters away from the continent, there is brought from below the deeper oceanic waters rich in nitrates. This deeper water also contains an abundance of silica owing to the low temperature and to the large quantity of rock waste swept down by individual glaciers as well as the Antarctic ice cap. There are 0.05 parts per million of nitrogen in Antarctic waters in contrast to the 0.15 parts per million in the North Atlantic and 0.10 in tropical oceanic waters. The result is an ideal home for that immense quantity of diatoms that furnish the base for higher forms of life in succession.

"This is the key to that immense development of seals, penguins, and whales, that excite our curiosity by their appearance in waters adjacent to the coldest, most desolate, and most terribly windswept land mass in the world, the 'home of the blizzard,' as Mawson called it. Mawson saw 161½ acres of penguins in Macquarie Island, half-way between New Zealand and Antarctica, and it is estimated that a million penguins were observed in one rookery in the South Orkneys, in latitude 60 degrees on the northern border of Weddell Sea."

In the studies made by these explorers we are learning more about the actual formation of the earth,

Dr. Isaiah Bowman

said Dr. Bowman, citing the theories of the late Prof. T. C. Chamberlin, of the University of Chicago.

"Reflecting on the great contrast between the north and south polar regions, the one a hollow, the other a hump," he declared, "Chamberlin speculated on the possibility that we have in these and other lineaments of our earth actual 'birthmarks,' as we may call them. He saw in the assembly of materials of which the earth is composed traces of the original bolt of matter shot out from the sun to make the infant earth. The core was built up of heavier material at the end toward the sun and of lighter material at the end away from the sun. The heavier Antarctic end was further shaped into the southern hemisphere while the lighter materials became the ring of land that makes the northern hemisphere. This might be called the 'ring of life' because it made that wide belt of dry land upon which the higher types of life emerged that reached their climax in civilized mankind."

Dr. Bowman praised the work of American newspapers in making the expeditions possible, addressing the three exploring groups.

"This wide interest we owe not only to yourselves but to the newspapers; and the time has come when science as well as the general public should acknowledge its indebtedness to the press," Dr. Bowman stated. "Without the assistance of the newspapers the well-equipped expeditions of recent years could not have been undertaken. However efficient airplanes may be, they are expensive things. Moreover, we are far more interested in an expedition from which we can have almost daily radio reports than we are in one that vanishes for several years, returns with news that blazes for a week, and then drops into the gulf of forgetfulness."

It is the possibility of more accurate weather forecasts for the southern hemisphere that offer some of the best reasons for the time and money expended on Antarctic exploration, Dr. Bowman believes.

"It would pay handsomely in crops and cattle and security of life if meteorological stations were set up on the borders of the Antarctic and in the island groups that girdle it," said Dr. Bowman. "If we knew the habit of the 'spells' of Antarctic weather there is little doubt that we should be able to find a connection between it and the rainfall and drought periods in the cereal and pastoral lands of Australia, South Africa, and Argentina. It is under the impulse of this idea that Captain Sir Hubert Wilkins has carried on his explorations in the Antarctic Archipelago for two seasons. He is not down there just for fun; he is searching for suitable bases for meteorological stations to be established by international cooperation. With a ring of such stations about the Antarctic, and with daily radio reports as to the weather, it would be possible to draw charts that would trace the effects of cyclones and anticyclones as they move forward from their breeding places out over the southern ocean.

"To forecast seasons of drought would be a practical achievement of the highest order, and no less important would it be to forecast seasons of exceptional rain. . . . It is not putting the case too strongly to say that the practical benefits of meteorological studies in the Antarctic through the medium of a chain of weather stations outweighs all other Antarctic interests put together."

Science News-Letter, February 15, 1930

Animals' Tails Are Tools of Many Uses

Zoology

Weapon, Propeller, Extra Hand, or What Have You

By Frank Thone

"Sir Brian had a battleaxe with great big knobs on;
He went among the villagers and blipped them on the head.
On Wednesday and on Saturday, but mostly on the latter day,
He called at all the cottages, and this is what he said:
'I am Sir Brian (ting-ling)
'I am Sir Brian (rat-tat)
'I am Sir Brian, as bold as a lion—
'Take that!—and that!—and that!'"

THUS A. A. Milne, in one of his unforgettable children's poems that have given endless delight to grown-ups. But the Sir Brian he celebrates, and all of his medieval mace-swinging compeers, were not in the least original. Their invention of a war-club "with great big knobs on" was anticipated by dumb animals in armor that roamed America from Texas and Oklahoma far southward to Patagonia, a quarter of a million years ago.

They were probably very dumb animals indeed, for they were related to the modern armadillos, and armadillos have never been noted for their mental brilliancy. They don't know enough to come in out of the rain. They don't need to; however, for it seldom rains in armadillo country. When they are pursued, they escape by burrowing into the ground. If a persecutor overtakes one it curls up into a ball, tucks its head between its feet, laps its tail over the joint, and waits for its enemy to tire of trying to break through its impervious shell of armor and go away.

These ancient armadillos, known collectively as glyptodonts, pursued much the same defensive tactics. They squatted down instead of rolling into a ball, pulled their helmeted heads back even with the porthole through which their necks protruded, and waited for their foe—saber-tooth tiger, perhaps, or cave bear—to attack. One of these glyptodonts must have been a tempting mound of meat to set before a hungry Pliocene carnivore, for a big specimen measured as much as fifteen feet from nose to tail, and its domed shell stood five feet or more high. Their dental structure shows that they were plant-eaters, hence that their meat must have been toothsome.

But woe to the bear or saber-tooth who might lust after such a walking fleshpot! These giants were not content to be meek though tough-shelled footballs, like their modern degenerate successors. A glyptodont couldn't use his head much, but he surely could use his tail.

Archaeopteryx, earth's earliest bird, had a long tail that was probably a valuable gliding plane as well as a rudder.

There it projected, five or six feet astern, a massive post of a tail, armored like the rest of the beast. The basal third was flexible, its armor in sliding rings. Then there came a long, rigid, tubular portion, ending in a great bristling spiky warclub—a mace, "with great big knobs on." Any meat-hungry animal that came within range of its sweep would not get off with being merely "blipped on the head". The blow of the spiked tail of Blippo the Glyp must have come with all the force of an elephant's kick—if you can imagine an elephant's hind foot armed with a cluster of pointed tusk-tips. It is hardly imaginable that a beast of prey would return to the attack after receiving one such side-swipe. If it escaped with its life it must have been glad enough to crawl off and nurse its broken legs and crushed ribs.

To zoologists this weird beast that made war with its tail is known as *Daedicurus clavicaudatus*. The first word is Greek, and means "skilled-tail"; the second is Latin for "club-tail". Which really sums up the situation very neatly. There were other glyptodonts that did not have the refinement of spiked mace-heads at the ends of their tails, but they could use their knob-crusted, hard-shelled caudices for weapons nevertheless, and brush off saber-tooth tigers as easily as a cow now brushes off flies.

Vastly more remote in time than the glyptodonts, a hundred million years ago or more, there were vegetarian dinosaurs that could also wage defensive warfare by wagging their tails. There were the stegosaurs, monsters as big as a good-sized garage, ornamented with a double row of bony plates the size of sidewalk slabs, set up edgewise.

Those slabs were their defensive armor. Their bodies were not encased in complete bony turrets after the fashion of the later-coming glyptodonts, but the standing slabs prevented the tyrannosaurs and other carnivorous gentry of their day from biting down into their spinal columns.

If a carnivorous dinosaur attacked a stegosaur, the latter probably pivoted its forequarters away from the onset and brought its massive muscular tail to bear. Instead of a spiky club, this tail was even more viciously armed with two pairs of two-foot horns or spikes—veritable natural sabers, pointing outward and upward. A fair blow with these weapons against the meat-basket of a rearing tyrannosaur must certainly have punctured him beyond all hope of repairs.

This use of the tail as a weapon is widespread in the animal world. It is only one of the many utilities of an organ which proud man, who hasn't any, is apt to rate below its true value to animals fortunate enough to have tails, or even to misprize as comic. A tail is anything but comic. It is one of the most versatile of all instruments. Mounted on the terminal facilities of many

Kinkajou climbs his own tail, hand over hand, like a sailor going up a rope.

different kinds of animals, both those now living and those that have lived during past geologic times, it has served most excellently as defensive weapon, protective camouflage, propeller, extra hand, third hind leg, and in a host of other ways. In the animal world it has been in a thousand instances literally a case of "Tails, you win!"

Even today there are animals that use their tails as effective weapons of defense, though we no longer have gigantic examples such as the glyptodonts and the stegosaurs. Just as well we don't, perhaps. But on a smaller scale, consider the porcupines. These interesting but unapproachable animals are found all over the world, from Canadian snows to African jungles. And whenever you find them, they will greet you in the same hostile fashion—by nervously flicking their tails.

Most porcupines have short, stubby tails, so that their "blipping" range is not great. But an animal craving the blood of a humped-up and bristling porky is very apt to sniff around the defenses and thereby bring its nose within this limited sweep. If it does, woe to dog, or coyote, or puma! For the stiff, needle-pointed spines on this caudal weapon come loose very easily, and stick fast in whatever they hit. They are armed with minute backward-pointing barbs that prevent them from coming out, and even cause them to work themselves into the flesh, causing severe pain and sometimes even death..

These easily-detachable tail-quills are probably the cause of the ancient myth that the porcupine can "shoot" its spines. Sometimes a few of them will be so loose that a flick will send them spinning through the air for several feet, and if they happen to hit end-on they will stick and begin to work themselves in. But this missile use of tail-quills is probably not intentional on the porcupine's part.

There is one species of porcupine in Africa that has developed its tail into a specialized weapon on somewhat the same plan as that followed by the spike-tailed glyptodont of old. There is a strong but unarmed portion sticking out aft for eight inches or some such matter, and on the end a thick brush of villainous stiff spines. It is hard to imagine even a leopard getting the better of this doughty defensive fighter.

The use of tails as weapons of offense is relatively limited, unless one would wish to classifiy the stings of bees and wasps as tails. If this be admitted, then the hunting wasps certainly owe their livings to their tails, for they provision their nests with spiders, caterpillars and other creeping things paralyzed by the thrust of these posterior daggers.

The military uses of the tail are not confined to its employment as an extra fist for dealing stout blows or as an arm wielding a handful of daggers. Tails are protective canopies of camouflage as well, as in the case of the squirrel. Its waving, flickering brush attracts attention away from the animal itself, and a dive at this conspicuous object will net the ambitious fox or dog nothing more than a mouthful of hair—if he gets there soon enough to grab that much. Another hairy tail is a banner of defiance; to wit, the skunk's. Not even the fiercest and hungriest beast is going to attack when that flag is displayed.

But in general, making use of the tail as a weapon is a very special development, an evolutionary afterthought. The original use of the tail was as an organ of locomotion, and most of its many modifications have been improvements in that field —adaptations to special problems in the business of getting about in the world.

The first vertebrates undoubtedly developed in the water. Their bodies were tapered, spindle-shaped affairs —their most immediate descendants, the fishes, have kept the tradition well. But the earliest, pre-fish animals did not have the broad tails of fishes. They had a fringe of fin running down most of the back and turning over the end of the tail to continue for at least part of the way up the under-side. When the ancestor-vertebrate needed to move it just wriggled, and the longer and flatter its tail happened to be the more effective the wriggle was in pushing it forward through the water. Fishes still wriggle, but the sharp expansion of their tails gives a much more efficient thrust. The fish-tail is the original screw-propeller.

More strictly land-going vertebrates often make use of their tails as a sort of third hind leg. A kangaroo's long, powerful hind legs and thick, muscular tail form a literal living tripod, and make him the stablest of all biped animals. Although not at all closely related to the kangaroos, many rodents have adopted the same tripod trick, leaping on long hind (*Turn to page* 110)

"With great big knobs on": The spiked tail of Daedicurus was the prototype of the mediaeval war mace, and terrible in battle against sabertooth tiger and cave bear.

The Basins of the Atlantic Ocean — A Science Classic

Oceanography

Report on Temperatures. By Staff-Commander T. H. Tizard, H. M. S. Challenger. GENERAL SUMMARY OF ATLANTIC OCEAN TEMPERATURE. H. M. S. Challenger Report No. 7, 1876.

One of the most remarkable scientific expeditions ever undertaken was the voyage of H. M. S. "Challenger" which sailed the seas from 1872 to 1876. A full complement of scientists to study all the interesting material obtained was carried around the world, and oceanography was established on a footing equal to that of other departments of knowledge of our globe. The account here reproduced from one of the "Challenger" reports gives the first attempt to map the bottom of the whole Atlantic Ocean.

OVER a great portion of the Atlantic, the bottom temperature has this peculiarity. If the depth be less than 2,000 fathoms we find the temperature at the bottom lower than that of any intermediate depth, but when the depth exceeds 2,000 fathoms we find that the bottom temperatures are nearly the same as they are at that depth, no matter how much the depth may exceed 2,000 fathoms, and this holds good for three-fourths of this ocean. In the remaining fourth the temperatures obtained at the bottom are much lower than in the other parts, and this fourth is not at either extreme, where there is a large amount of surface cold, but occupies the whole of the western portion of the South Atlantic as far north as the Equator.

The results of these temperatures may be classified as follows:

If an imaginary line be drawn from French Guiana to the westernmost island of the Azores, and from thence nearly due north; on the western side of this line the extreme range of our temperatures, at depths exceeding 2,000 fathoms, is only 1°, viz., from 34°.4 to 35°.4. Thirty-two observations of bottom temperature at these depths were obtained in this portion of the Atlantic, and in only one instance did the thermometer give so high a result at 35°.4, and in two instances so low a result as 34°.4, and the two cases where these low readings were obtained were very unsatisfactory. . . . We therefore think ourselves justified in assuming that in that portion of the Atlantic west of the imaginary line the bottom temperature at depths exceeding 2,000 fathoms is uniform a 35°.

In that part of the North Atlantic on the eastern side of the line joining French Guiana with the Azores, etc., 27 observations of bottom temperatures were obtained at depths exceeding 2,000 fathoms. The extreme range of the whole 27 observations is 1°, from 34°.8 to 35°.8, their mean being 35°.3. As (on the western side of this imaginary line) these differences are so slight, and a degree of the thermometer is so small, that the discrepancies may easily be ascribed to errors of eye in reading, more especially when we consider that of the 27 results 16 agree to 0°.3, only varying from 35°.2 to 35°.5, and those that differ are not concentrated in any particular locality, but are distributed over the whole of the North Atlantic east of the imaginary line, we think ourselves justified in assuming that in this portion of the Atlantic the bottom temperature at depths exceeding 2,000 fathoms is uniform at 35°.3.

Similar results to these were obtained by the German Frigate "Gazelle" in the eastern part of the South Atlantic, eastward of a line joining Tristan da Cunha with Ascension. . . .

Between Tristan da Cunha island and the Cape of Good Hope four soundings were obtained at depths exceeding 2,000 fathoms, and here the bottom temperature was much colder, varying from 32°.9 to 34°, the mean being 33°.5. It is therefore nearly certain that the uniform bottom temperature of 35°.3, which exists in the whole of the eastern portion of the Atlantic, does not extend farther south than an imaginary line joining Tristan da Cunha with the Cape of Good Hope.

It will thus be seen that a nearly uniform bottom temperature is found over three-fourths of the area of the Atlantic. In the remaining fourth, viz., from the east coast of South America to a line joining Tristan da Cunha with Ascension, and from the Equator to the southward, the bottom temperature was invariably colder than that of any intermediate depth, no matter whether the depth was 500 or 2,900 fathoms; and this temperature was found to vary from 31° to 33°.5, a bottom temperature of 32°.4 being found as far north as latitude 1° 45′ S. in 2,475 fathoms, between St. Paul's rocks and Fernando Noronha island and another of 32°.7 being found in 2,350 fathoms, in latitude 2° 42′ S., between the island of Ascension and the Equator.

It appears, therefore, that the high-bottom temperature obtained in this portion of the South Atlantic (where the depth exceeds 2,000 fathoms) is colder than the lowest bottom temperature obtained in any portion of this ocean (excepting in one instance the "Porcupine" having obtained a temperature of 29° close to the Faroe islands), and that water of a temperature of 32°.5 extends in the western part of the South Atlantic nearly to the Equator, whilst in the remainder of this Ocean the average bottom temperature is 2½ degrees warmer, and this difference appears to be, so far as has yet been ascertained, divided by a pretty sharp line, on one side of which we get the cold water and on the other side the comparatively warm water. . . .

The question then arises as to the cause which confines the cold water to the bottom portion of the western half of the South Atlantic.

An examination of the soundings which have been taken in this ocean, combined with the results of the bottom temperatures, leads to the conclusion that there are a series of ridges dividing its bed into two basins, one of which occupies the whole of the western portion of the North Atlantic, whilst the other extends the whole length of the ocean on its eastern side; and that the cold water in the western portion of the South Atlantic is due to there being no obstruction between the bed of this portion of the ocean and the bed of the Antarctic basin; in fact, that this is a kind of tongue of the Antarctic basin. For example, if the direction of the imaginary line from French Guiana to the Azores, and from thence northward, be followed on a chart showing the soundings ob-

tained in the Atlantic, it will be seen that close to this line, and along its whole extent, there are a series of soundings of less than 2,000 fathoms; these soundings are not sufficiently numerous to prove by themselves alone the continuity of the ridge of less than 2,000 fathoms in depth, but taken in conjunction with the bottom temperatures, they may be considered as being sufficient evidence.

Between the west coast of Ireland and the south point of Greenland (Cape Farewell) are a series of soundings of less than 2,000 fathoms, and the ridge stretching north from the Azores meets the other ridge between Ireland and Cape Farewell, and and so encloses a deep basin in the western part of the North Atlantic, the water in which is cut off from the cold stream at the bottom of the tongue of the Antarctic basin. The existence of the ridge between French Guiana and the Azores was originally discovered by the U. S. Ship "Dolphin."

Between Tristan da Cunha and Ascension island a series of soundings were obtained in March, 1876, which show that a ridge of less than 2,000 fathoms in depth extends between those islands and from one or two other soundings obtained north of Ascension by the "Hydra" and German Frigate "Gazelle," this ridge may be extended in a N.N.E. direction from the position of lat. 2° S., long. 2° S. and 10° W. Between this position and St. Paul's rocks various soundings have been taken, nearly all of them under 2,000 fathoms, so that the ridge takes a W. by N. direction from the position of lat. 2° S., long. 10° W., to St. Paul's rocks.

Westward of St. Paul's rocks towards the Dolphin ridge there are no soundings, but it is probable that the ridge continues in a W.N.W. diection from St. Paul's rocks until it joins the Dolphin ridge, as north of this line the bottom temperatures are 2½ degrees warmer than they are south of it.

To distinguish these ridges we propose to call the one between Tristan da Cunha and Ascension the "Challenger ridge," and the one joining the Dolphin and Challenger ridges the "Connecting ridge."

Between Tristan da Cunha Island and the coast of Africa there also appears to be a ridge running irregularly to the northeastward from Tristan da Cunha to the African coast. Only two soundings have been obtained on it, one by the "Hydra," of 1,800 fathoms, and the other by the "Gazelle," of 1,950 fathoms. But as all the temperatures south of the ridge are more than a degree colder than those north of it, we may conclude that it is continuous from Tristan da Cunha to the African coast.

This view of the division of the Atlantic into basins is also confirmed by the serial temperature soundings; for if the mean of the temperatures obtained at depths below 1,000 fathoms be taken either in the North or the South Atlantic, the curve of these mean temperatures will be very nearly a straight line, which, if produced, gives us the least depth at which the mean bottom temperature of the Atlantic basins should be found, and, consequently, the greatest depth of the ridges separating those basins from each other, and from the tongue of the Antarctic basin.

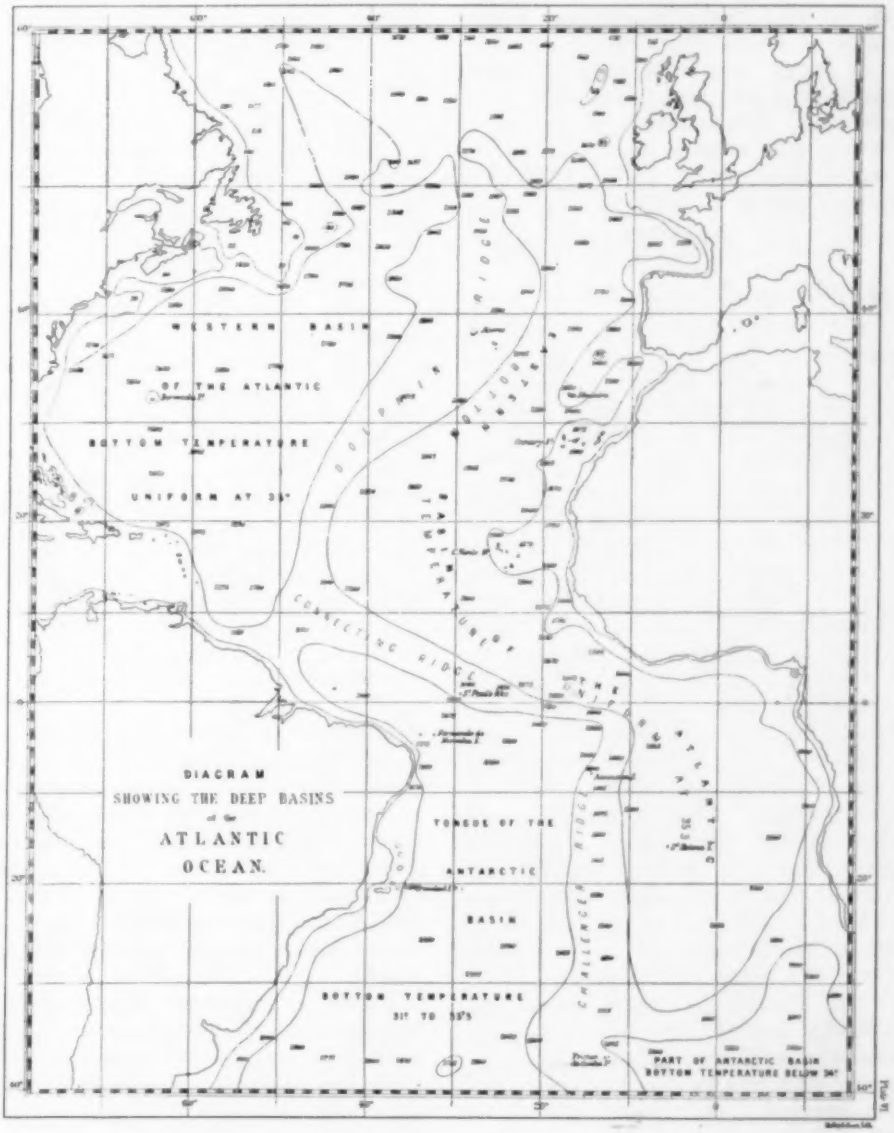
If the mean results be plotted, and a curve drawn it will be seen that this, the mean temperature curve, is a straight line, and that if it be produced it cuts the isotherm of 35° at 2,000 fathoms, and that of 35°.3 at 1,850 fathoms. . . .

The same process applied to the temperatures of the North Atlantic gives nearly similar results. . . .

Both these curves cut the temperature of 35°.3 at the same depth, viz., 1,850 fathoms.

As this is the mean bottom temperature of the eastern basin of the Atlantic, this appears to indicate that the ridge which separates this basin from the western basin of the North Atlantic as well as from the western part of the South Atlantic cannot exceed 1,850 fathoms in depth, and that in this basin the temperatures from that depth are uniform to the bottom.

The temperature line of 35°, or the mean bottom temperature of the Western Atlantic basin, is reached at the depth of 2,000 (*Turn to page* 108)



Strong Glass

A bit of glass about a sixteenth of a square inch in area bearing a load of approximately fifteen tons, is the simple new weapon of science developed by Prof. Thomas C. Poulter of Iowa Wesleyan University.

It served as a tiny window looking into a pressure-chamber, where experiments are performed under the tremendous pressure of thirty thousand atmospheres. The little glass window is ground perfectly flat and set against a disk of high-speed steel, also ground perfectly flat. There is no gasket; the pressure attends to the sealing of glass against metal.

Physics
Science News-Letter, February 15, 1930

Move River

Several hundred acres of swamp land practically in the heart of Dallas, Texas, are being reclaimed for commercial and aviation purposes by the removal of the Trinity river to an entirely new channel for a distance of about 20 miles.

A large area will also be made available for vegetable and fruit growing. The building of the levees which will confine the river is expected to be completed by 1933. The cost is put at $2,000,000.

Engineering
Science News-Letter, February 15, 1930

Radio to Moon

Extremely short radio waves, ten meters or less in length, may provide a possible means of sending a signal to the moon if an experiment suggested by Dr. A. Hoyt Taylor, chief of the radio division of the Naval Research Laboratory, is made.

It is not with any hope of communicating with inhabitants of the moon that he plans this test. His laboratory is conducting research on radio transmission. If successful, the lunar signal would provide a check on the travel time of radio waves in outer space. He suggested that the signal would be reflected from the moon's surface back to the earth, where delicate receiving instruments might detect the echo. Thus, it would be similar to the "earth-shine," the faint glow that can be seen on the dark side of the moon when almost new, caused by the reflection back to the earth of sunlight that was reflected from the earth to the moon.

Dr. Taylor cautiously states that nobody knows whether the moon really would reflect the radio waves back, and whether or not they could be detected if they were. But he has studied radio waves that have traveled around the earth four and five times, 125,000 miles or more, and still retained enough power to produce effects that could be photographed. The moon is about 240,000 miles away from the earth, so that a radio wave would have to travel something less than a half million miles for the round trip. His studies show that a wave could travel this distance and still be detected. The trip would take about 2.5 seconds.

Several years ago Dr. Carl Störmer, a Norwegian physicist, observed echoes of short wave radio signals several seconds after transmission, and concluded that they were due to reflection from a layer far out in space, even beyond the moon. His ideas have not been generally accepted, but it is known that very short radio waves, around ten meters or less, can penetrate the Kennelly-Heaviside layer, the sheet of partly broken atoms high in the atmosphere that reflects back the longer waves.

Radio
Science News-Letter, February 15, 1930

Three Vitamins

Cheering news for those who make malted milk the mainstay of the working or school day is to be found in the report of E. J. Quinn and L. B. Brabec of Columbia University to the American Home Economics Association.

These investigators have found malted milk a good source of vitamins A, B and G. However, a sample of a chocolate-flavored variety had not so high a vitamin content as the unflavored or "straight" malted milk. The extensive use of malted milk for invalid and infant feeding led the investigators to examine samples for vitamin content. Vitamin A is known as a preventive of eye diseases, vitamin B prevents beri-beri, and vitamin D prevents pellagra.

Physiology
Science News-Letter, February 15, 1930

Brighter Than Sun

An analysis of the electric spark completed in the physics department of the University of California by means of a camera whose shutter operates in one-billionth of a second discloses that during its brief life a 20,000-volt spark is 50 per cent. hotter than the sun and 100 times more bright.

Using a special electro-optical shutter camera developed by Abraham Lemoine and J. W. Beams of Yale, the experimenters were able to take what amounted to slow-motion pictures of the life of a spark at intervals of four one-millionths of a second, and show how the appearance of a spark changes from beginning to end.

The spark lasts only one hundred-thousandth of a second, but that would allow time for about 250 views at the time interval in which the camera shutter operates.

The camera which made the work possible is not a mechanical device, but makes use of the physical properties of light for its operation. The spark literally takes its own picture.

Physics
Science News-Letter, February 15, 1930

IN VARIOUS CI

13-*Month Year*

Calendar simplification and the international adoption of the thirteen month year is urged in a resolution adopted by the American Association for the Advancement of Science announced by Dr. Burton E. Livingston, permanent secretary.

This organization of some 18,000 scientists went on record favoring: "A revision of the calendar such that the year will consist of thirteen months of twenty-eight days each, and an extra day of non-week-day name, with an additional midyear leap day in leap years."

Reaffirming calendar reform advocated in resolutions adopted in 1925, the association declared that "calendar simplification should be internationally adopted for the benefit not only of scientific work, but also of commerce and of the peoples of the earth in their daily lives, and for the promotion of international and national understanding."

Chronology
Science News-Letter, February 15, 1930

Reducing Chrome Hazard

New methods of ventilating worked out by the U. S. Public Health Service may save thousands of workers in automobile factories from serious nose trouble, now often caused when accessories and trimmings on the car are treated to a coat of non-tarnishable chromium.

Hydrogen, carrying a slight amount of chromic acid, is released in the plating process, Dr. L. R. Thompson of the Public Health Service explained to the House Committee on Appropriations, and if this passes a man's nose, it may be drawn up and be deposited on the septum.

"If this continues, in a short time

SCIENCE FIELDS

he loses the entire nasal septum. . . . Some automobile companies have tried ventilation, but the methods they were installing would draw the air straight up rather than across the vat. . . . . We showed them that if they would draw the current of air across rather than up it would relieve the situation."

Public Health
Science News-Letter, February 15, 1930

Two-Headed Snake

A sure-'nuff two-headed snake, with nothing anti-Volsteadian about it, has been captured in Louisiana, and is described and pictured in the *Journal of Heredity* by Prof. Wm. H. Gates of Louisiana State University.

The freak snake was found by a couple of small boys, who followed their usual instincts and killed it. They brought the limp remains home with them, and the specimen is now the property of J. D. Morrison of Denham Springs, La.

Both heads are apparently normally developed, though one of them is twisted a little sideways on its neck. The two necks join in a common body, which had a permanent and apparently congenital kink in it a little aft of the point where the two necks join. Prof. Gates has not dissected the specimen, but states that he expects to make X-ray photographs soon in an endeavor to learn something about the skeletal arrangements.

Zoology
Science News-Letter, February 15, 1930

One Hundred Millions

Middle-western states are waiting with keen interest for a report from the U. S. Army engineers which soon will recommend to Congress the establishment of a nine-foot channel on the Upper Mississippi from Cairo, Illinois, to the Twin Cities.

Completion of this project will give the Mississippi from the Gulf to Minnesota a channel of such depth that inland waterway commerce can develop to greater extent than heretofore possible.

The project is said to be one of the greatest engineering efforts ever undertaken by the government, and before completion will call for the expenditure of at least $100,000,000. It is expected that both legislation authorizing and appropriating for this work, and the engineering itself will proceed rapidly, and that there will be no delays such as characterized the construction of the Ohio channel project.

Among other inland waterway developments being considered by the government at the present time are the linking of the Great Lakes with the Ohio River by one of four routes and a complete connection of the Ohio River with the Potomac, using the present Chesapeake and Ohio Canal as part of such connection. This old canal was used until 1924. George Washington himself made the original survey. But seventy-five miles through the mountainous Cumberland country remain to be conquered in engineering this water link between the Middle West and the Atlantic Ocean.

Engineering
Science News-Letter, February 15, 1930

X-Ray Diamond Detection

The practicability of the reported plans of the government authorities of the Union of South Africa to frustrate diamond smugglers by means of X-ray examinations of the smugglers (SCIENCE NEWS-LETTER, July 6, 1929, p. 7) has been questioned by a New York surgeon, Dr. Howard Lilienthal. Because the transparency of diamonds to X-rays is very high, the detection of the jewels in the human body would undoubtedly require great care and skill.

Dr. Lilienthal, in cooperation with a New York roentgenologist, Dr. Leopold Jaches, made an interesting experiment in this connection. A diamond of 2.45 karats and a piece of cooked goosebone of about the same size were placed beneath a mass of wet cotton about one and one-half inches thick and were exposed to the X-rays. In the resulting picture the shadow of the goosebone was more prominent than that of the diamond. From this experiment Dr. Lilienthal concludes that the recognition of diamonds, especially those of the so-called rough variety as they come from the mines, would be almost if not quite impossible.

"One could not be sure that the shadow seen would not be that of some object in the intestinal canal, such as a piece of bone which had been swallowed with food. And, too, if the diamond happened to be in alignment with one of the normal bones of the body, such as that of the spine or pelvis, its discovery would be still more improbable," Dr. Lilienthal stated.

Roentgenology
Science News-Letter, February 15, 1930

Element 87 Found

With a method so delicate as to detect the presence of a chemical compound when dissolved in ten billion times its own weight of water, Dr. Fred Allison and Edgar J. Murphy, of the physics department of Alabama Polytechnic Institute, have located the unknown element number 87 in two well-known minerals. They will make a preliminary report of their research in the forthcoming issue of the *Physical Review*, official journal of the American Physical Society.

Lepidolite, a form of mica, and pollucite, a mineral consisting chiefly of the elements caesium, aluminum and silicon, were the substances studied. As the properties of element number 87 are known in a general way, even though it has not yet been discovered, Dr. Allison and his colleagues were able to predict its effect. Studies of the substances in four different chemical combinations all showed the effects that would be caused by element 87. This, say the experimenters, "affords evidence of considerable weight for its presence in the sample under test."

The next step will be to extract the element from the minerals, and when this is done it may truly be said to have been "discovered." Then only one unknown element will be left. According to modern conceptions there are 92 elements, numbered from hydrogen, which is number 1, to uranium, number 92. At present the series has two vacant spaces, one being number 87, to which the name eka-caesium has been tentatively assigned, and which is in the same group as lithium, potassium, rubidium and caesium. The other undiscovered is number 85, in the same group as fluorine, chlorine, bromine and iodine, known chemically as halogens.

About seven years ago there were six unknown elements. Then, in 1923, two Danish chemists, Coster and Hevesy, found number 72, which they named hafnium, after the Latin name for their city of Copenhagen. In 1925, Dr. Walter Noddack, at the University of Berlin, with the aid of two assistants, discovered numbers 43 and 75, which he named, respectively, masurium and rhenium. This was followed in 1926 by illinium, number 61, discovered by Dr. B. S. Hopkins, and named after the University of Illinois, with which he was connected. This was the first element discovered by an American.

Chemistry
Science News-Letter, February 15, 1930

Telephone to Link Four Continents

Electrical Engineers Told of Latest Radio Achievements

TELEPHONES on four continents will soon be within reach of each other when a radio telephone circuit between New York and Buenos Aires is opened in a few weeks, T. G. Miller, general manager of the long lines department of the American Telephone and Telegraph Co., announced to the American Institute of Electrical Engineers. Already 85 per cent. of the world's telephones, located in United States, Canada, Mexico, Great Britain, most countries on the continent and one point in Africa, can be connected through four radio circuits. One is a long wave circuit, the other three use short waves, below the broadcasting bands.

In another paper at the same session, A. A. Oswald, of the Bell Telephone Laboratories, told of some of the technical equipment used. Now stations have been established at Lawrenceville, N. J., for transmitting and at Netcong, N. J., for receiving. At the former center are located four transmitters, three for transmission to Europe and one for South America. For each transmitter there are three antennas, capable of sending on a different wavelength, so that the best length can be chosen, at any time. When transmission is unsatisfactory on one length, another can often be used to advantage. The antennas are directional. One set is oriented to give maximum strength in the direction of Buenos Aires, and the other three are aimed at London. They do not point in these directions, however. Actually, the direction in which they send is at right angles to that which they point, so the South American antenna runs almost east and west.

The receiving station at Netcong, is also equipped to handle four separate circuits simultaneously, one from South America and three from England, each with a choice of three separate wavelengths. This station is located about 50 miles from Lawrenceville, as this is about the distance at which the short waves are least effective. These waves show the so-called "skip distance," a point thousands of miles away receiving the signals better than one but a few miles distant. They are also placed so that neither station is in line with the direction of transmission or reception of the other.

In the case of the short waves, it is not so necessary to shorten the distance between the transmitter and receiver as with long waves, said F. A. Cowan, another A. T. & T. engineer, at the meeting. The original transatlantic telephony was with long waves, and the receiver for the English signals was placed at Houlton, Me., about 600 miles from New York, because of the shortening of the path over which the waves must travel. Land wires carry the messages to New York. This station is still in use, supplemented by three short wave circuits, all in addition to the South American short wave circuit.

To converse with Buenos Aires, only short waves will be used, Ralph Bown, of the A. T. & T. Company's department of development and research, told the engineers. Severe static may cause interruptions on both long and short waves at the same time, though the latter are less affected, he said; but on the other hand, fading, or poor transmission accompanying a magnetic storm, may hinder the short waves while the long waves are unaffected. In fact, he said, magnetic disturbances sometimes improve long wave daytime reception. However, with long circuits crossing tropical sources of static facing the directional antennas, short waves alone can be used.

Mr. Bown told of one source of interference that can be controlled.

"There is one other type of noise than that provided by Nature which is of particular importance at short waves—electrical noise from the devices of man," he said. "One of the worst offenders is the ignition system of the automobile. The short-wave transoceanic receiving station at Netcong, New Jersey, is so located that automobile roads are at some distance, particularly in the direction from which reception occurs.

EVEN though it has been a time of remarkable development in transatlantic radio, both telephone and telegraph, the decade since the war has seen an unprecendented increase in the speed of cable transmission, which has brought a corresponding increase in patronage. At the meeting of the American Institute of Electrical Engineers, L. S. Coggeshall, general traffic supervisor of the Western Union Telegraph Co., told of the recent advances in cable technique, and predicted still further increases in speed in the near future, along with such other improvements as the development of telephone cables.

Before 1918, said Mr. Coggeshall, the transatlantic cables were operated in sections with hand relays. That is, a message from New York to London would be sent to Nova Scotia, there an operator would receive it and send it on to Newfoundland, thence in the same way it was relayed to Cornwall, and finally to London. With skilled operators, however, the delay at each station was cut down to a few seconds, he stated.

Since 1918, however, automatic relays have been introduced, and even permit the use of printing machines, which type out the message ready to be delivered to the addresses. These improvements, said Mr. Coggeshall, have resulted at the end of the post-war decade in "transmitting speed of a different order of magnitude from those characteristic of its beginning."

Mr. Coggeshall predicted extensive use of electrical relay connections between land wires and cables, so that direct connection could be obtained between important points in all parts of Europe and America.

Science News-Letter, February 15, 1930

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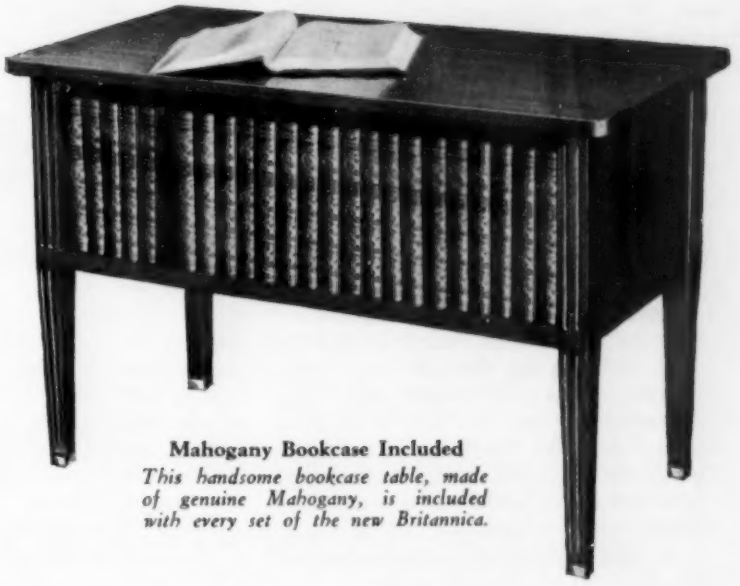

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Chinese and Occidentals Agree on Skull

Anthropology

Peking Man is Pronounced Advanced Human Type

THE skull of *Sinanthropos pekinensis,* or "Peking Man," which was found early in December in a cave 40 miles from Peiping, represents a considerably more advanced type of human being than *Pithecanthropus erectus,* the so-called ape-man of Java. On this point all the scientists, both Chinese and Occidental, who gathered at Peiping recently to discuss the much-controverted cranium, found themselves in substantial agreement.

Prof. Davidson Black, who has been slowly disengaging the skull from the matrix of travertine in which it was embedded when found, stated that it is of about the same length as the Javanese skull, but that its eminences, or bulges, on both front and sides, indicate both a larger and a more highly developed brain than *Pithecanthropus* could have possessed. He estimated the difference in cranial capacity to be about 25 per cent. in favor of Peking Man.

In other respects, the skull is still of a primitive character, in Prof. Black's opinion. The very pronounced eyebrow ridges are shared with *Pithecanthropus* and also with Neanderthal Man. The lower jaw of the particular skull discovered in December is missing; but two fragmentary jaws found in 1928 are of a massive, primitive type.

W. C. Pei, the young Chinese geologist who carried on the excavations and actually discovered the skull on the last day planned for excavation in 1929, told of the toil of himself and his large crew of Chinese helpers in the cave, or more properly the fissure, of Chou Kou Tien. The skull was found in a side pocket opening out of a shaft that was dug down through a mass of fossil-filled debris that choked up this deep vertical fissure in a limestone formation. Previous excavations, followed by Mr. Pei's own diggings during the season, have turned out fossil bones of a great variety of animals, including insectivora, bats, dogs, bears, hyenas, rodents, horses, elephants, rhinoceroses, deer, beaver and a saber-tooth tiger. One notable find of the present season was the complete skull of a rhinoceros, with the lower jaw still in place.

Pére Teilhard de Chardin, S.J., one of the discoverers of Piltdown Man in England twenty years ago, has gone over the geological evidence and is convinced that the skull belongs to the Pleistocene, or Ice Age, probably early Pleistocene.

"In Chou Kou Tien," he said, "stratigraphical and paleontological evidences suggest that the deposits of the cave are much older than the time during which the Neanderthal man was living in Belgium, France and Spain. When the cave was inhabited and gradually filling, the hyena, rhinoceros and horse which were still alive were distinctly connected with the Tertiary fauna of China: *Machairodus* (the saber-tooth tiger) a characteristic Quaternary animal spread world-wide, was still wandering in the western hills."

Basins of the Atlantic—*Continued*

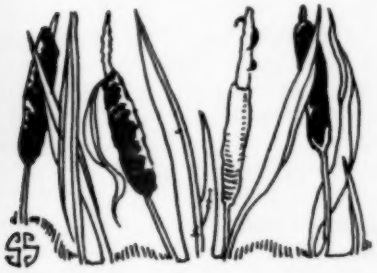
fathoms by the mean temperature curve of the South Atlantic, and at 1,950 fathoms by that of the North Atlantic. This shows that the ridge separating the western North Atlantic basin from the South cannot exceed the depth of 2,000 fathoms, and that from that depth to the bottom the temperatures in this basin are uniform. . . .

As salt water at its temperature of congelation is denser than at any higher temperature; its temperature of maximum density being about 2° lower than its temperature of congelation, the water just before it congeals being heavier than the water at any higher temperature would sink, and would in time (did no other cause intervene) occupy the whole of the space in the ocean not influenced by the sun's heat. That is that the whole volume of the ocean, excepting a wedge of the maximum depth of 100 fathoms, would be at about the temperature of the freezing point of salt water. But in considering the effect of the heat imparted to the surface we have also to consider the effects of evaporation and precipitation. Where the heat is greatest, there evaporation takes place quickest, and consequently although the surface water may be warmer, yet by reason of its increased salinity it may be also denser than the water beneath, so that it would sink and impart its heat by convection to the subjacent layers. But all the water evaporated from the surface is also precipitated again, not necessarily in those parts from which the greatest portion has been evaporated, consequently it appears that the salinity and denseness of the surface water depends on at least three factors: its temperature, the amount evaporated, and the amount of rain precipitated. Where the amount evaporated greatly exceeds the amount precipitated, there the surface film constantly descending imparts its heat to the water beneath, but where the precipitation is nearly equal to or exceeds the evaporation there we might expect the warm water to remain on the surface and the isotherms to occupy but a small space in depth.

In the equatorial regions it appears that although the evaporation is very great still the precipitation is also, as a rule, more than in any other part of the world, so that, although it may not be equal to the amount evaporated, it is still sufficient, in conjunction with the temperature, to prevent the surface film becoming denser than that below, so that the heated water remains on the surface. Were this water to remain in the same position an excess of evaporation over precipitation would doubtless in time render its salinity sufficient to cause it to sink, but this water is, from the friction of the trade winds, aided by the earth's motion, constantly being propelled to the westward, and meeting on the western side of the Atlantic with an obstructing point of the South American continent is deviated to the northward, so that the greater part of this heated surface film is forced into the North Atlantic with sufficient violence to cause a rapid current to issue from the Strait of Florida, which current is familiarly known by the name of the Gulf Stream, and the impetus thus given to these equatorially heated waters appears to be, not only sufficient to supply that stream, but to cause a slower movement to the northwestward outside the islands of the Caribbean sea, which water eventually joins the southern side of the rapidly moving Gulf Stream.

NATURE RAMBLINGS

By Frank Thone



Winter Reeds

"The sedge has wi'hered from the lake
"And no bird sings."

There, in two sure strokes of genius, we have a clean picture of the gray bleakness of winter. Surely nothing can more thoroughly convince one of cold than to walk along the shores of a frozen lake, crunching under foot the thin edges of the ice, with the stubble of last year's reeds and rushes sticking through, or perhaps to stand on the muddy margin of a pond whose bitter black waters are just not quite cold enough to freeze except for small splinters, like slim horizontal icicles, in among the stems, where the water is held still long enough to form them.

Yet without the decorations of sedges, cattails and other shore plants our winter lakes and ponds would seem even more naked and chill. Ragged and gray though they are, they are still trimmings of a sort, like bits of fur edging on a worn-out coat. And they offer shelter and the chances of food to straggling birds of the shore-hugging habit, for down among their matted roots and rhizomes there is an abundance of sluggish animal life to be probed out by the long bills of waders, and tucked away between the bases of their broken leaves and the stems earwigs and similar light-shunning insects lurk.

Some day, when the overpopulation that is always being talked about really arrives, the shore plants are going to be worked for what they are worth. Immediately under the mud at the bottom, they form massive mats of vegetable matter, which are their storehouses to provide for spring growth and blossoming. At present those reserves of starch are not worth raiding, but the day may come when we shall be glad to have them.

Animals' Tails—*Continued*

legs and resting upright with the aid of their tails. Such rodents are found in many parts of the world, and are almost always nicknamed "kangaroo rats," and "kangaroo mice".

Tails may be extra legs to ground-dwelling animals, but to animals that live in the trees, where a clinging hand is more important than a bracing foot, the same versatile organ becomes a third hand. Right where it is handiest too: well astern and behind the back, where the regular equipment of fingers and toes is most at a disadvantage. The classic examples of such five-handed climbers are of course the monkeys; the cool insouciance of a Rhesus or a spider-monkey in the zoo, as he swings indifferently by hand, foot, or tail, is one of the sure-fire attractions at any zoo.

But clinging tails are older by far than monkeys. The same primitive and very ancient mammalian family that boasts the kangaroo and his other weird relatives in Australasia has as its sole American representative the 'possum, beloved of Southern cooks. Nobody who has ever treed a 'possum needs to be told to to what good effect this hard-tailed animal can grip a topmost branch and defy all efforts to dislodge him until the tree itself is chopped down.

The versatility of the tail in evolutionary development is strongly brought out again in the case of a South American tree-porcupine. All porcupines can climb trees, but this one lives almost altogether among the branches. And its tail, instead of being a dagger-loaded weapon, has become as prehensile as that of a monkey or an opossum.

Perhaps the extreme development of tails as hands is to be found in the kinkajou, an attractive little South American animal of the raccoon family. "Kinky's" tail is a rope as well as a hand. He swings by its curved and clinging tip until he tires of the exercise, and then he turns and climbs up his own tail like a sailor going up the rigging.

Swimmers in the thin ocean of air that is above our heads use their tails during every moment of flight. But whereas fishes use them as propellers, birds employ them only as rudders, and sometimes as brakes. A bird without a tail is one of the most luckless and ludicrous of animals. It has almost no control over its vertical steering, and has considerable trouble as well in lateral turns.

Modern birds have very short tails, with the feathers set side by side like the ribs of a fan. But the earliest bird of which we have any fossil record had a real tail—a continuation of its spinal column nearly as long as its own body. Each joint was equipped with a pair of feathers, so that the spread of surface thus obtained must have been of considerable sustaining power in flight, not to mention its value as a strong and flexible rudder.

One of the most remarkable tails in the world is that possessed by the whip scorpion, known in the Southwest as the vinegarun or vinegaroon and in Florida as the grampus. This large and stout-bodied cousin of the true scorpions is dreaded as deadly throughout its wide range, but is absolutely harmless. The well-muscled and poison-tipped tail of the true scorpion is represented here by a thin, wirelike appendage, as long as its body or longer, but without the trace of a sting.

Just why this reduced trace of a scorpion tail should be carried to such a length it is hard to imagine. But the whip scorpion always has it, except when it has been broken off by accident—which does not seem to embarrass the vinegarun at all. It is carried clear of the ground, and constantly quivers and trembles, as though in great excitement. It may be that it serves as a sort of feeler, keeping the animal apprized of the approach of a possible enemy from the rear, and therefore of the need for more haste in moving along.

Whatever may be the case, here we have an undoubted example of an organ, useful in a related form, fallen into uselessness, and probably in the process of disappearing. Spiders, which are tailless, are evolutionary cousins of scorpions. It may be that in the whip scorpion we have a hint of how spiders lost their tails.

There are, on another branch of the zoological family tree, numerous species of tailed monkeys that make no use of their tails. Some of them have fairly long tails, others, like the ground-dwelling baboons, have short ones. It may be that here also we have a hint of the development of the tailless apes, man's nearest cousins on the animal side, from an original stock of happy and irresponsible swingers-by-the-tail.

FIRST GLANCES AT NEW BOOKS

ELECTRON PHYSICS—J. Barton Hoag—*Van Nostrand* ($3). Seldom does a new book so completely and adequately fill a vacancy as this. So rapid has been the advance of physical science in recent years that few books cover all of the experiments and discoveries concerned with the electron and its nature, while none hitherto has described the fundamental experiments in such a way that the student could repeat them. In this book Prof. Hoag describes such experiments as the determination of the charge of the electron by the oil drop method, measurements of the range of alpha, beta and gamma particles and even such a recent one as that of Davisson and Germer demonstrating the reflection of electrons, which has provided such strong experimental support of the theory of wave mechanics. Prof. Hoag's experience in this field with graduate students at the University of Chicago assures its practical value..

Physics
Science News-Letter, February 15, 1930

THE HISTORY OF A CRIME AGAINST THE FOOD LAW—Harvey W. Wiley—*Wiley* ($2). Dr. Wiley, the father of the food and drug law, has written a brief account of how it was finally passed and of the changes in its present mode of enforcement from that which was originally intended. The story is told largely through the testimony given at the various hearings on the subject, with comments in Dr. Wiley's delightfully critical style.

Chemistry—Nutrition
Science News-Letter, February 15, 1930

GLIMPSES INTO THE WORLD OF SCIENCE—Edited by Mary G. Phillips and W. H. Geisler—*Heath* (80c.). A neatly published little book containing essays on various scientific topics by well-known authors, adapted for use as a collateral reader in schools, or for the general reader who wants something he can stick into his pocket and browse at from time to time.

General Science
Science News-Letter, February 15, 1930

WINTER BOTANY—William Trelease—*William Trelease, Urbana, Ill.* ($2.50). A compact, pocket-size manual for the identification of trees and shrubs in winter. The clear-cut line illustrations, bringing out analytical points in buds, bark, pith and other structures, are especially useful.

Botany
Science News-Letter, February 15, 1930

HEREDITY IN MAN—R. Ruggles Gates—*Macmillan* ($6). Human heredity has aroused considerable interest in recent years both on the part of the general public and the scientists. The increased knowledge on the subject has caused Dr. Gates to issue a completely revised edition of his book. In spite of the popularity of the subject the book is rather too technical for popular reading but will be of considerable interest to geneticists.

Genetics
Science News-Letter, February 15, 1930

THE THIRD ROUTE—Sir Philip Sassoon—*Doubleday, Doran* ($3). The eyes of continental Europe, particularly England, still turn to India and the Orient. But, in the days before Columbus set sail for the Indies, a long sailing voyage around the Cape of Good Hope was necessary to reach Bombay. When steam conquered the sea and the Isthmus of Suez was cut by a ribbon of water, the Mediterranean and the Red Seas provided easier access. The third route of today is by air. In this book is a story of such an air cruise by the then British Under Secretary of State for Air.

Aviation
Science News-Letter, February 15, 1930

THE FIVE-DAY WEEK IN MANUFACTURING INDUSTRIES—*National Industrial Conference Board* ($1.50). To work or not to work on Saturday is the question discussed in this economic study. Factories with a large variety of output are now using some variation of the five-day week and this study by a leading investigational bureau summarizes facts and opinions.

Economics
Science News-Letter, February 15, 1930

THE EDUCATIONAL SIGNIFICANCE OF LEFT HANDEDNESS—Ralph Haefner—*Teachers College, Columbia Univ.* ($1.50). A careful comparison of right-handed school children with left-handed children and some "betwixts-and-betweens" who learned to write with the right hand but were otherwise left-handed. No significant differences were found between the groups as regards physique, intelligence, scholarship, interests, or emotionality. A greater tendency to speech defects appears among left-handers who use the right hand for writing. A concluding chapter discusses educational implications of the problem.

Psychology—Education
Science News-Letter, February 15, 1930

AIRPLANE MECHANICS RIGGING HANDBOOK—Rutherfurd S. Hartz and Elzor E. Hall—*Ronald Press* ($3.50). Those who service and perform the important function of keeping in good mechanical trim the ships of the air will benefit from this book.

Aviation
Science News-Letter, February 15, 1930

THE ECOLOGY OF TROUT STREAMS IN YELLOWSTONE NATIONAL PARK—R. A. Muttkowski; and THE FOOD OF TROUT STREAM INSECTS IN YELLOWSTONE NATIONAL PARK—R. A. Muttkowski and G. M. Smith—*Roosevelt Wild Life Forest Experiment Station* ($1.25). These two studies, which constitute Vol. 2, No. 2 of the Roosevelt Wild Life Annals, are basic to an understanding and intelligent management of what is probably the most intensively fished and most copiously re-planted of the greater trout stream areas in this country.

Ecology
Science News-Letter, February 15, 1930

HANDBOOK OF AMERICAN PRISONS AND REFORMATORIES—Edited by Paul W. Garrett and Austin H. MacCormick—*National Society of Penal Information* ($4). How prisons should and should not be run is a topic of frequent and intense discussion among Americans. This handbook enables the reader to compare conditions in the various institutions, for its devotes generous space to each federal prison, and to each prison and adult reformatory of the forty-eight states.

Sociology
Science News-Letter, February 15, 1930

AN INTRODUCTION TO THE STUDY OF HUMAN ANATOMY—Robert James Terry—*Macmillan* ($3.50). This text consists of directions for the medical student to follow in his dissection, with suggestive questions about the structures under discussion and references for supplementary reading.

Anatomy
Science News-Letter, February 15, 1930

WITCHES STILL LIVE—Theda Kenyon—*Ives Washburn* ($3.50). The author tells us about love charms, witchcraft murders, the gospel of witches, the casting of spells, and other strange matters, and the material collected is mostly from contemporary beliefs and customs. According to her statement, more than half the people in the world today believe in occult powers the basis of which is the old cult of witchcraft.

Ethnology
Science News-Letter, February 15, 1930

First Glances At New Books—*Continued*

DIATOMACEOUS EARTH — Robert Calvert—*Chemical Catalog Co.* With this, the Chemical Catalog Company adds another book to its highly valuable series getting into single volumes all the pertinent information about materials of value or interest in chemical manufacturing processes. The beds of diatomaceous earth, laid down ages ago by inconceivable numbers of silica-skeletoned plants, play a very large part in the production of modern absorbents, cements and abrasives.

Chemistry
Science News-Letter, February 15, 1930

LINCOLN LIBRARY OF ESSENTIAL INFORMATION—*Frontier Press* ($15.50). As a compendium of all knowledge this volume of over two thousand pages will not replace the larger encyclopedias, but it should prove helpful and valuable to those who wish to have in small compass a reference book of general information. The science sections seem to be compiled with intelligence and care.

Reference
Science News-Letter, February 15, 1930

THE FUNDAMENTALS OF RADIO—R. R. Ramsey—*Ramsey Pub. Co.* ($3.50). An excellent textbook of radio written so that a minimum of mathematics is required for its comprehension. Though intended for use as a text, it will also be of value to the amateur who wants to know more of how the radio works.

Radio
Science News-Letter, February 15, 1930

WHY WE ARE WHAT WE ARE—Theodore Hubert Larson—*American Endocrine Bureau* ($10). The long-suffering endocrine glands are again the subject of a pseudo-scientific book intended for popular reading. The author of this volume has a theory of "endocrine exchange" by which he explains and defines various "types" of men and women. A smattering of scientific terms and facts are used to express this highly unscientific theory.

Endocrinology
Science News-Letter, February 15, 1930

EAST AFRICAN REPTILES AND AMPHIBIANS IN THE U. S. NATIONAL MUSEUM—Arthur Loveridge—*U. S. Government Printing Office* (25c). This publication, Bulletin 151 of the U. S. National Museum, will be of interest chiefly to systematic zoologists.

Zoology
Science News-Letter, February 15, 1930

SKY TRAVEL—A. Ralph and Margaret Romer—*Rand McNally* $1.48). A textbook for graded schools introducing children to the facts of aviation by the story method.

Aviation
Science News-Letter, February 15, 1930

STUDY OF THE WHEAT SITUATION, AUGUST TO NOVEMBER, 1929—M. K Bennett and others—*Food Research Institute, Stanford University, Calif.* This most recent number of the Wheat Studies series discusses cereal crops of 1929, marketing and stocks, international trade, wheat price movements, and the outlook for trade, carry-overs and prices. The gist of world statistics on wheat for the period covered is given in an appendix of tables.

Economics
Science News-Letter, February 15, 1930

A SYSTEMATIC CLASSIFICATION FOR THE BIRDS OF THE WORLD—Alexander Wetmore—*Smithsonian Institution.* This little reprint—of only eight pages—will be a useful working tool for many zoologists, for it arranges in order of natural relationship all known families of living and fossil birds.

Ornithology
Science News-Letter, February 15, 1930

EXPERIMENTAL SCIENCE—A. Frederick Collins—*Appleton* ($2). In this latest book by one of the most prolific authors of educational yet entertaining books for young people, Mr. Collins describes a number of physical experiments, all of which can be performed with the simplest apparatus. Just the book for that nephew (or niece) with a scientific turn of mind.

Physics
Science News-Letter, February 15, 1930

IN ANIMAL LAND—Mabel Guinnip LaRue—*Macmillan* (80c.). Nicely illustrated animal bedtime stories in big print for little folks.

Children's Stories
Science News-Letter, February 15, 1930

PATHOGENIC MICROORGANISMS—William Hallock Park, Anna Wessels Williams and Charles Krumwiede—*Lea and Febiger* ($6.50). The ninth edition of this standard text has been enlarged and revised to include the latest knowledge of scarlet fever, yellow fever, measles, undulant fever, tularemia, complement fixation, etc. The book will be welcomed by the many workers in medical bacteriology.

Bacteriology—Medicine
Science News-Letter, February 15, 1930

GENERAL COLLEGE PHYSICS—Harrison M. Randall, Neil H. Williams and Walter F. Colby—*Harpers* ($3.50). Three Michigan professors have here produced a book that has already proved its value through its use in their courses in mimeographed form. It is well written and up to date, and treats the fundamental principles from a modern viewpoint.

Physics
Science News-Letter, February 15, 1930

STOCK-POISONING PLANTS OF THE RANGE—C. D. Marsh—*U. S. Government Printing Office* (35c). The facts about what plants are poisonous and what the effects of these plants are, have been so confused by conflicting reports, arguments and sheer superstition that the appearance of this pamphlet (U. S. Department of Agriculture Bulletin No. 1245) will be most welcome to both plant student and practical stockman.

Botany—Animal Husbandry
Science News-Letter, February 15, 1930

HOOKWORM DISEASE—Asa C. Chandler—*Macmillan* ($5). The author has coordinated the work of modern investigators with the older knowledge of the subject, giving a complete account of the disease with methods of diagnosis, treatment, prevention and control. Public health officers, sanitarians and physicians practicing in tropical regions will undoubtedly welcome this volume.

Medicine
Science News-Letter, February 15, 1930

REPORT OF THE TWENTY-SECOND NATIONAL CONFERENCE ON WEIGHTS AND MEASURES—*U. S. Government Printing Office* (30c). Among the most fundamental standards of daily life are those used in the calibration of yardsticks and scales by which the over-the-counter commodities of merchants are measured. Each year the officials of cities and states charged with inspecting measuring and weighing devices on behalf of the public, meet at the National Bureau of Standards.

Measurements
Science News-Letter, February 15, 1930

PLANT MATERIALS OF DECORATIVE GARDENING: THE WOODY PLANTS—William Trelease—*William Trelease, Urbana, Ill.* ($1.25). Generic descriptions, with keys to species, of the principal shrubs and trees useful for ornamental plantings.

Biology
Science News-Letter, February 15, 1930